Local Area Impact Assessment Groups and Arizona Drought Monitoring

Cochise County Local Area Impact Assessment Group

Tuesday, January 31, 2006
Cochise County Board of Supervisors Hearing Room
1415 Melody Lane, Bldg. G
Bisbee, Arizona 85603

GDTF • Governor's Drought Task Force
ARIZONA DEPARTMENT OF WATER RESOURCES
SECURING ARIZONA'S WATER FUTURE

Arizona Drought Monitoring Technical Committee

NRCS Natural Resources Conservation Service

ARIZONA DEPARTMENT OF WATER RESOURCES
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CLIMAS

NOAA

NATIONAL WEATHER SERVICE

SRP
Delivering More Than Power

ARIZONA DIVISION OF EMERGENCY MANAGEMENT

THE UNIVERSITY OF ARIZONA
ARIZONA COOPERATIVE EXTENSION
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
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USGS
science for a changing world
Water Resources of ARIZONA

OFFICE OF THE ARIZONA STATE CLIMATOLOGIST

Components of Drought Risk Management

Risk = Hazard x Vulnerability

(natural event)

(social factors)

Monitoring

Including LAIAGs

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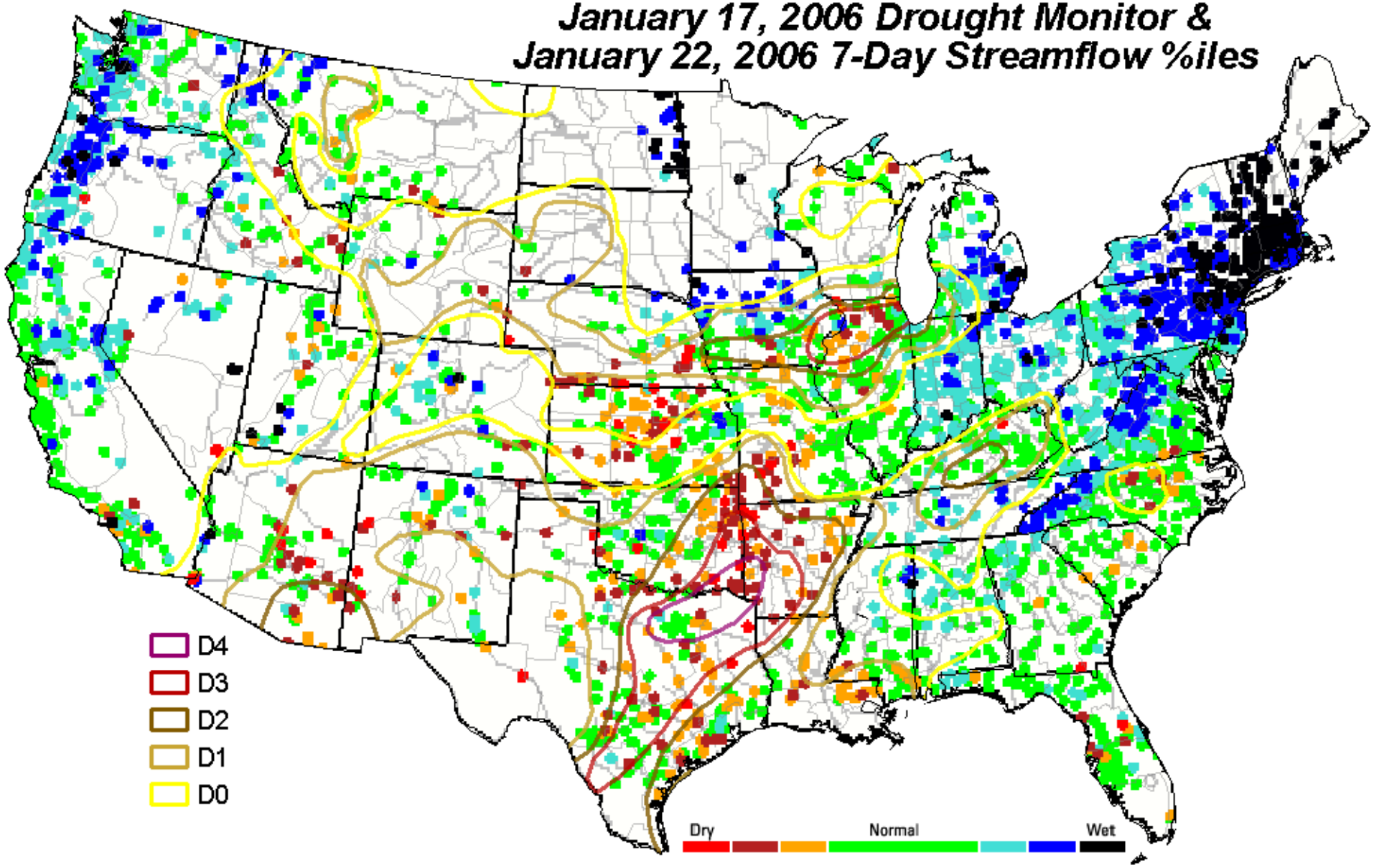
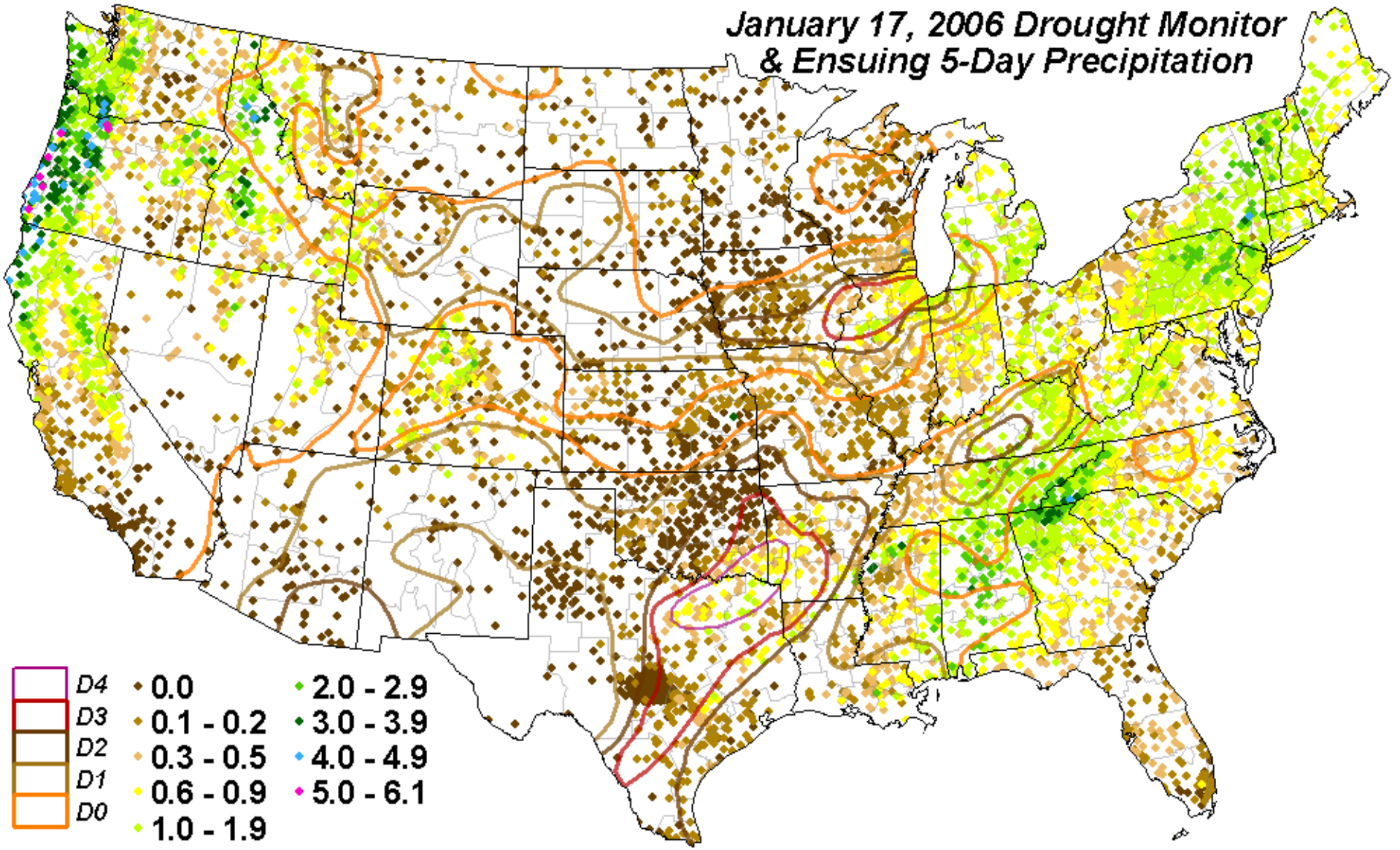
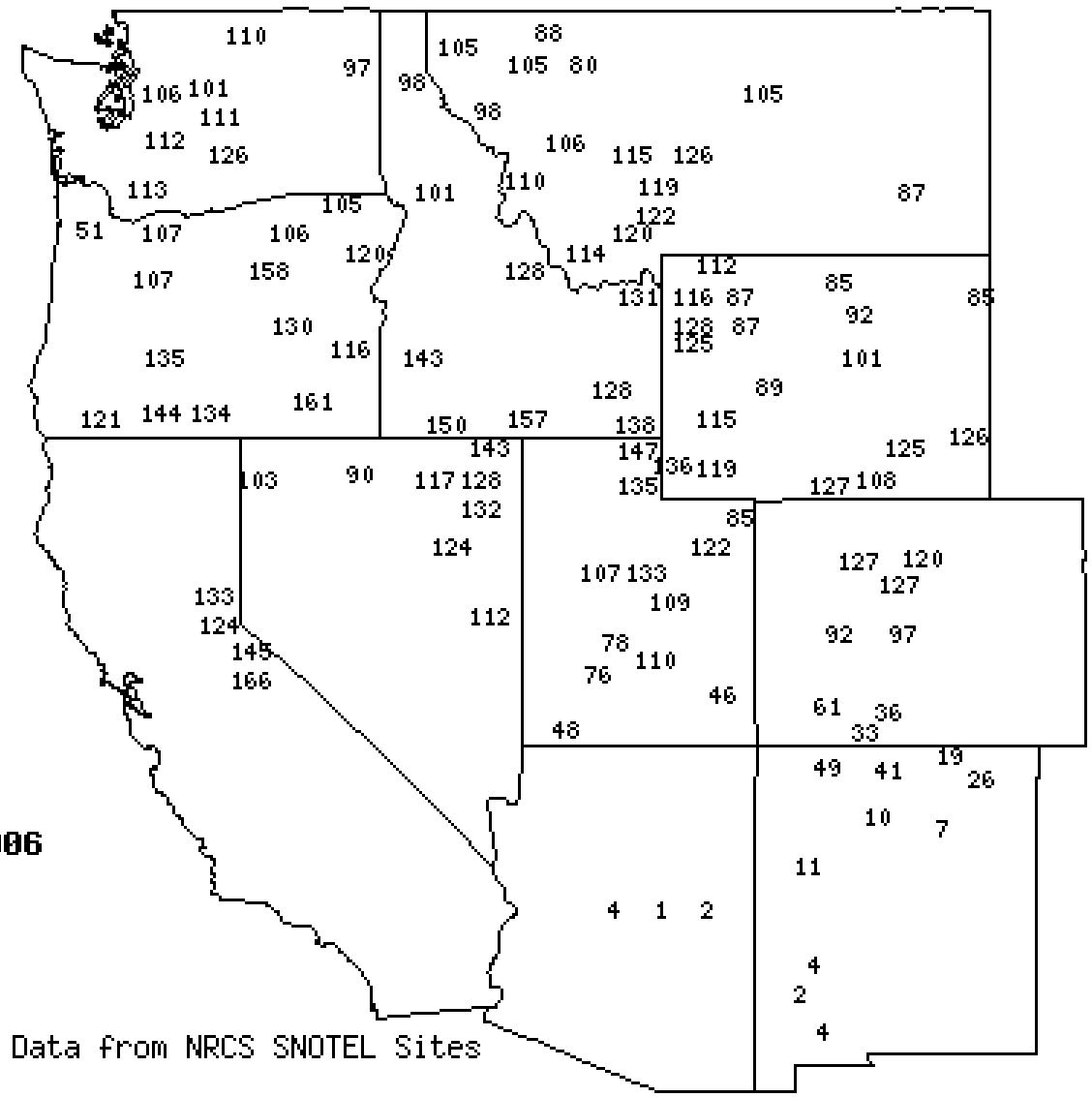

January 17, 2006 Drought Monitor &
January 22, 2006 7-Day Streamflow %iles
D4
D3
D2
D1
D0
Dry
Normal
Wet


January 17, 2006 Drought Monitor
& Ensuing 5-Day Precipitation
D4
D3
D2
D1
D0
0.0
0.1 - 0.2
0.3 - 0.5
0.6 - 0.9
1.0 - 1.9
2.0 - 2.9
3.0 - 3.9
4.0 - 4.9
5.0 - 6.1

Basin Average Snow Water Content. (% of Average.)



Report Date:

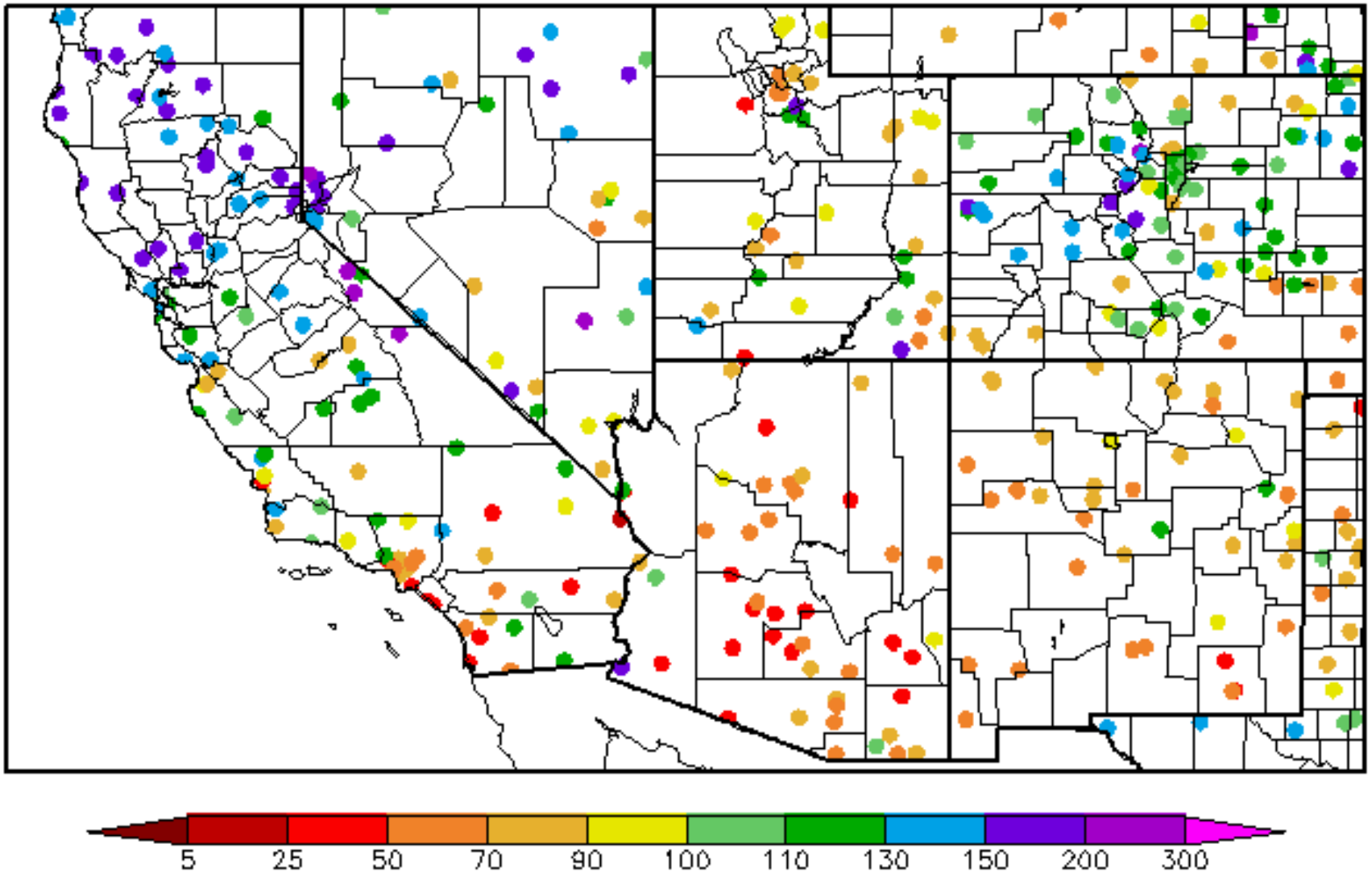
JANUARY 23 , 2006

Provisional Data
Based on Mountain Data from NRCS SNOTEL Sites

Data provided by
Water and Climate Center
National Resource Conservation Service
Portland, Oregon

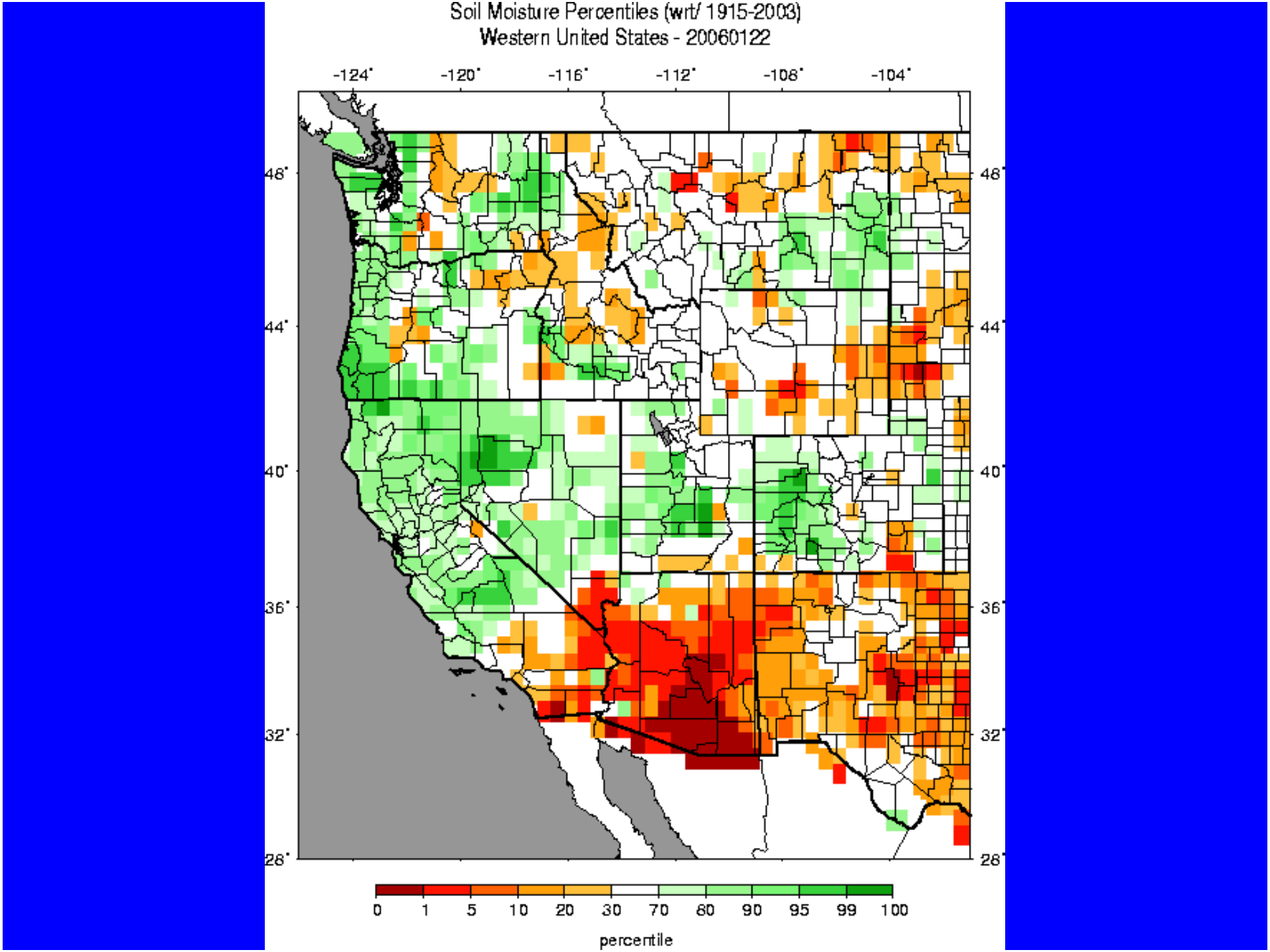
Western Regional Climate Center
Desert Research Institute
Reno, Nevada

Percent of Normal Precipitation (%)
7/24/2005 – 1/23/2006



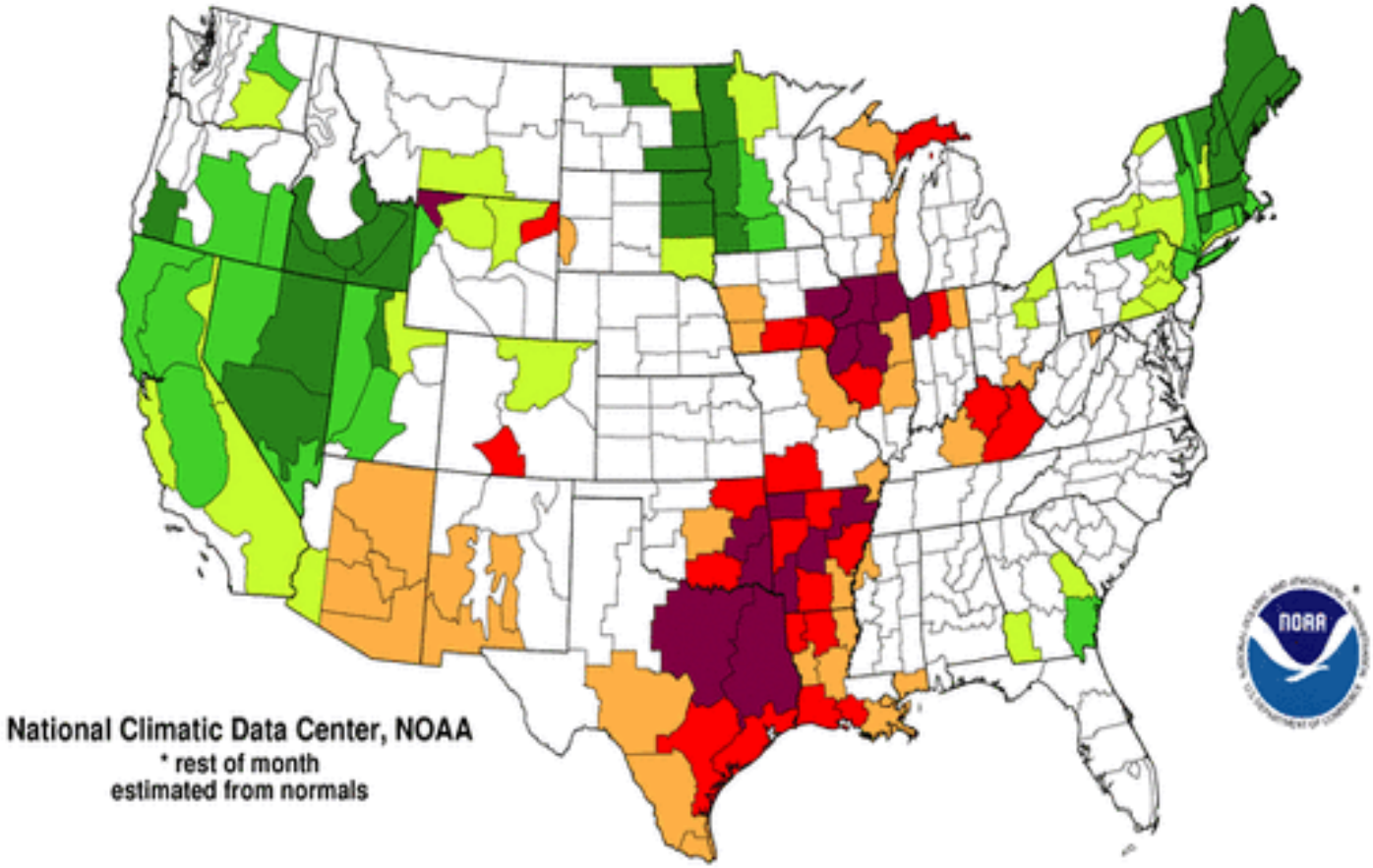
Generated 1/24/2006 at HPRCC using provisional data.

NOAA Regional Climate Centers


Soil Moisture Percentiles (wrt/ 1915-2003)
Western United States - 20060122
-124°
-120°
-116°
-112°
-108°
-104°
48°
44°
40°
36°
32°
28°
0
1
5
10
20
30
70
80
90
95
99
100
percentile

Palmer Drought Index
Long-Term (Meteorological) Conditions

January 2006: through January 14, 2006*



National Climatic Data Center, NOAA
* rest of month
estimated from normals

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

Drought Indicators

Data to describe drought conditions

- For example: precipitation, streamflow, groundwater, drought indices

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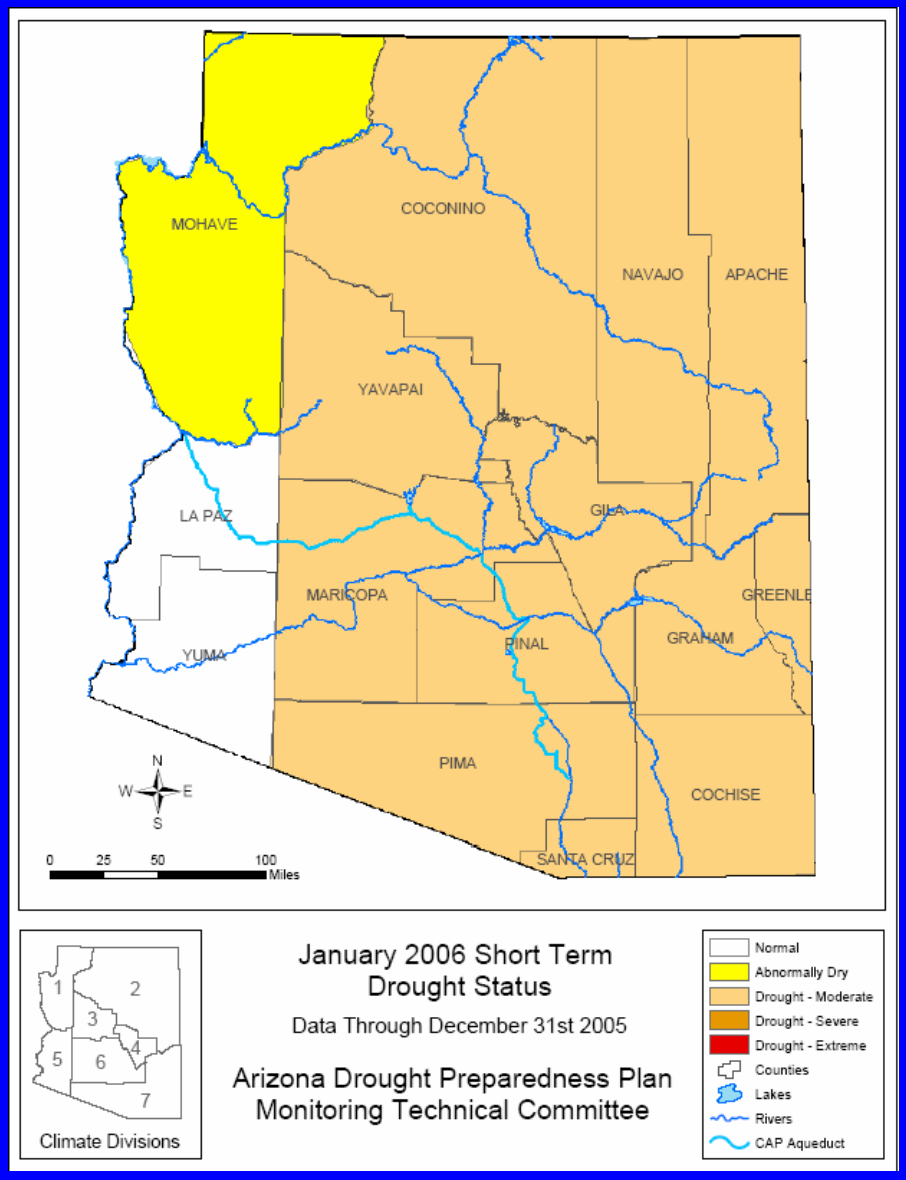
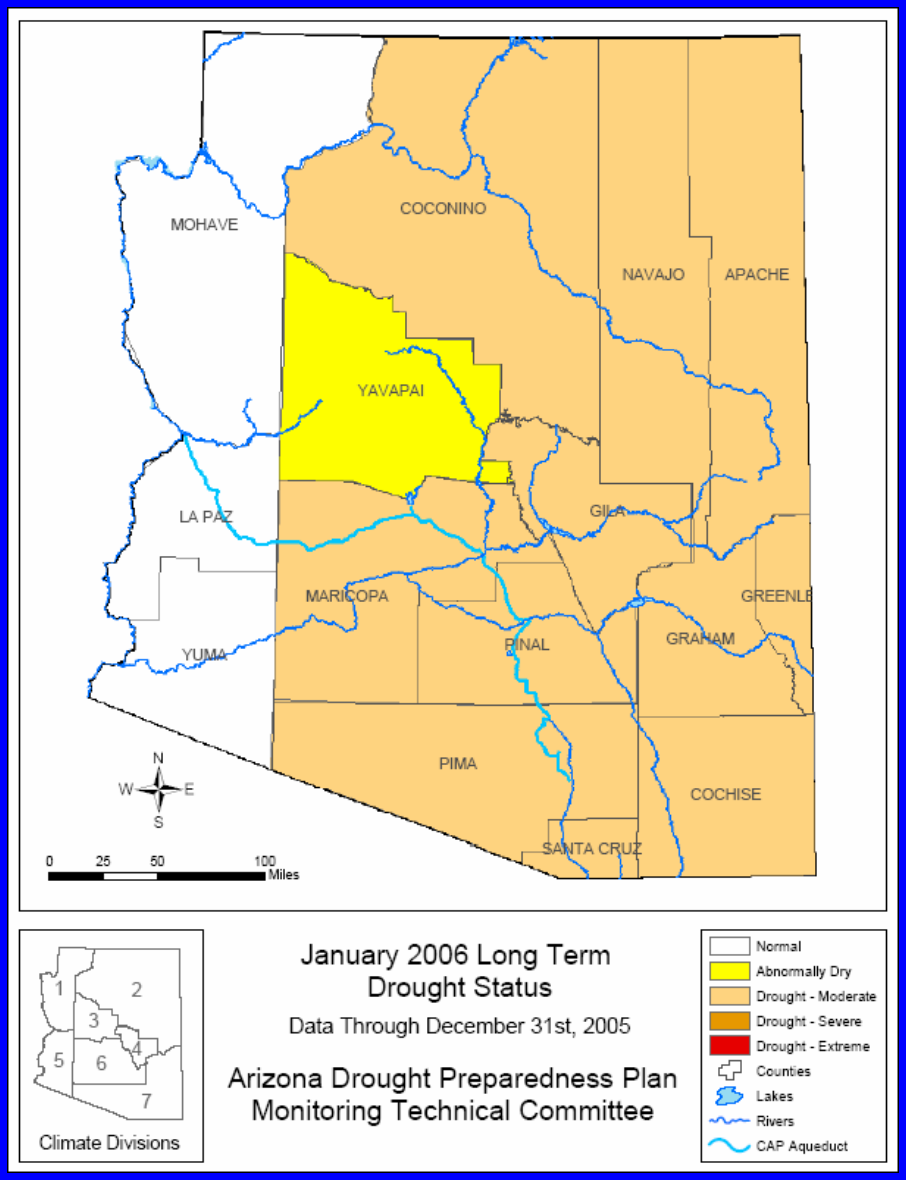
Drought Triggers

Specific values of the indicators that initiate and terminate drought status levels and management responses

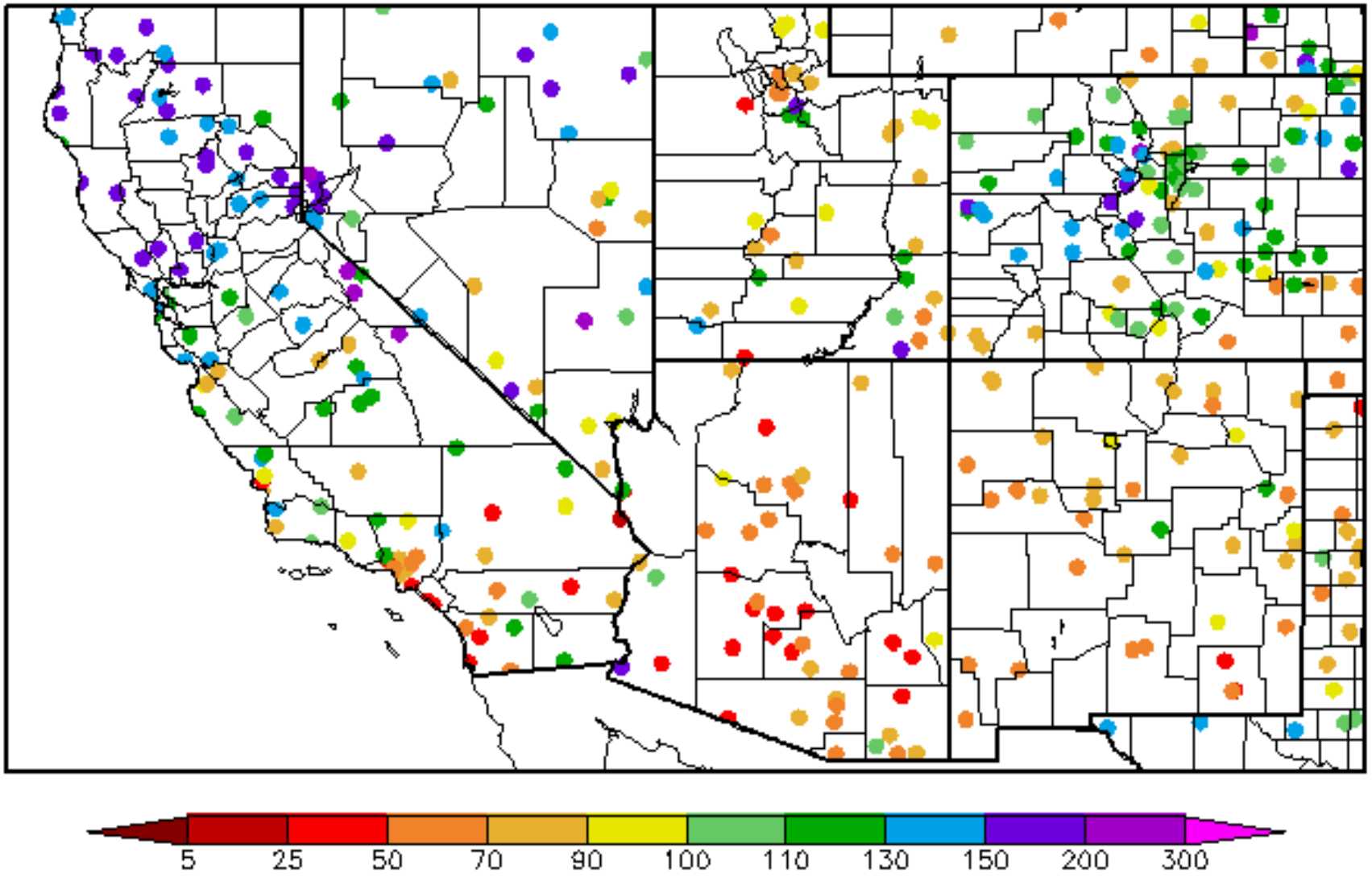
Level	Description	Percentile
0	No Drought	40.1-100.0%
1	Abnormally Dry	25.1-40.0%
2	Moderate Drought	15.1-25.0%
3	Severe Drought	5.1-15.0%
4	Extreme Drought	0.0-5.0%

January 2006 Status Maps





Percent of Normal Precipitation (%)
7/24/2005 – 1/23/2006

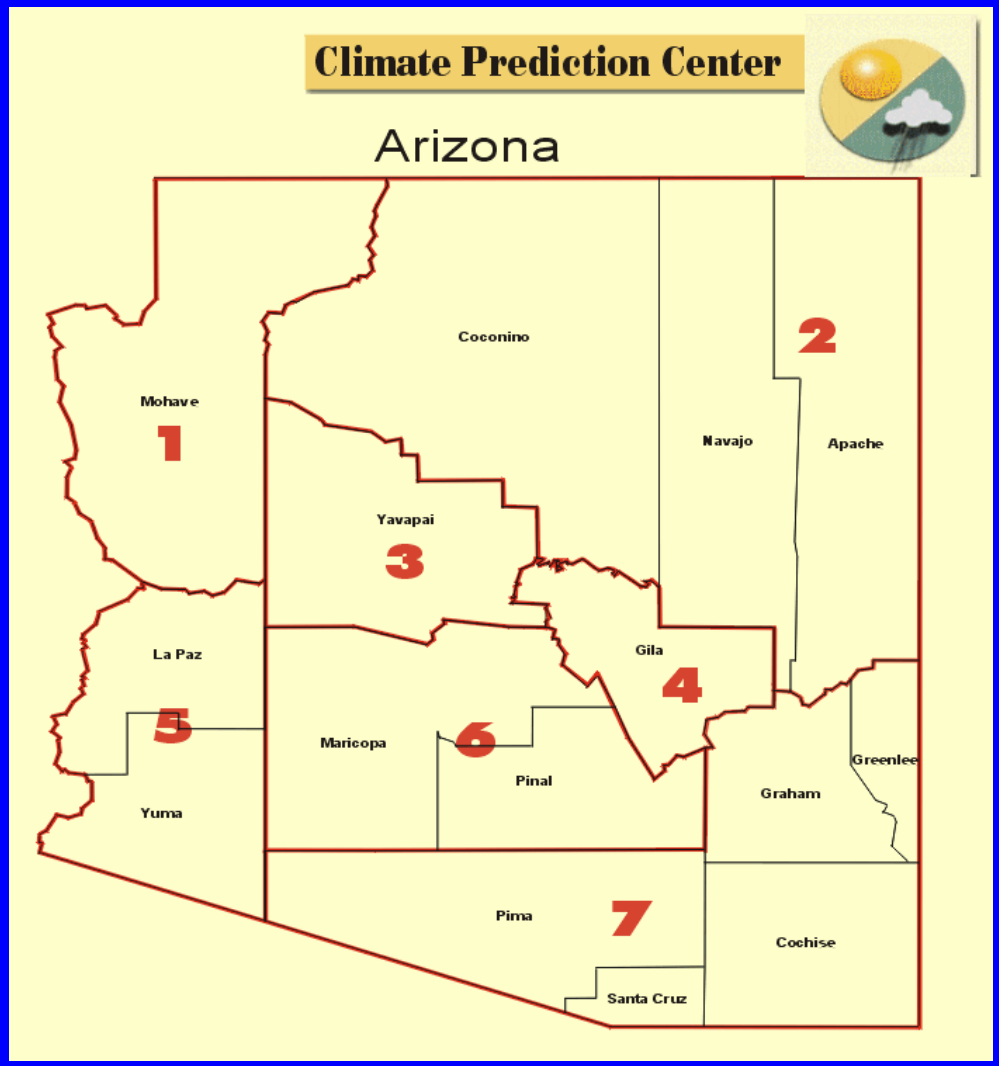


Generated 1/24/2006 at HPRCC using provisional data.

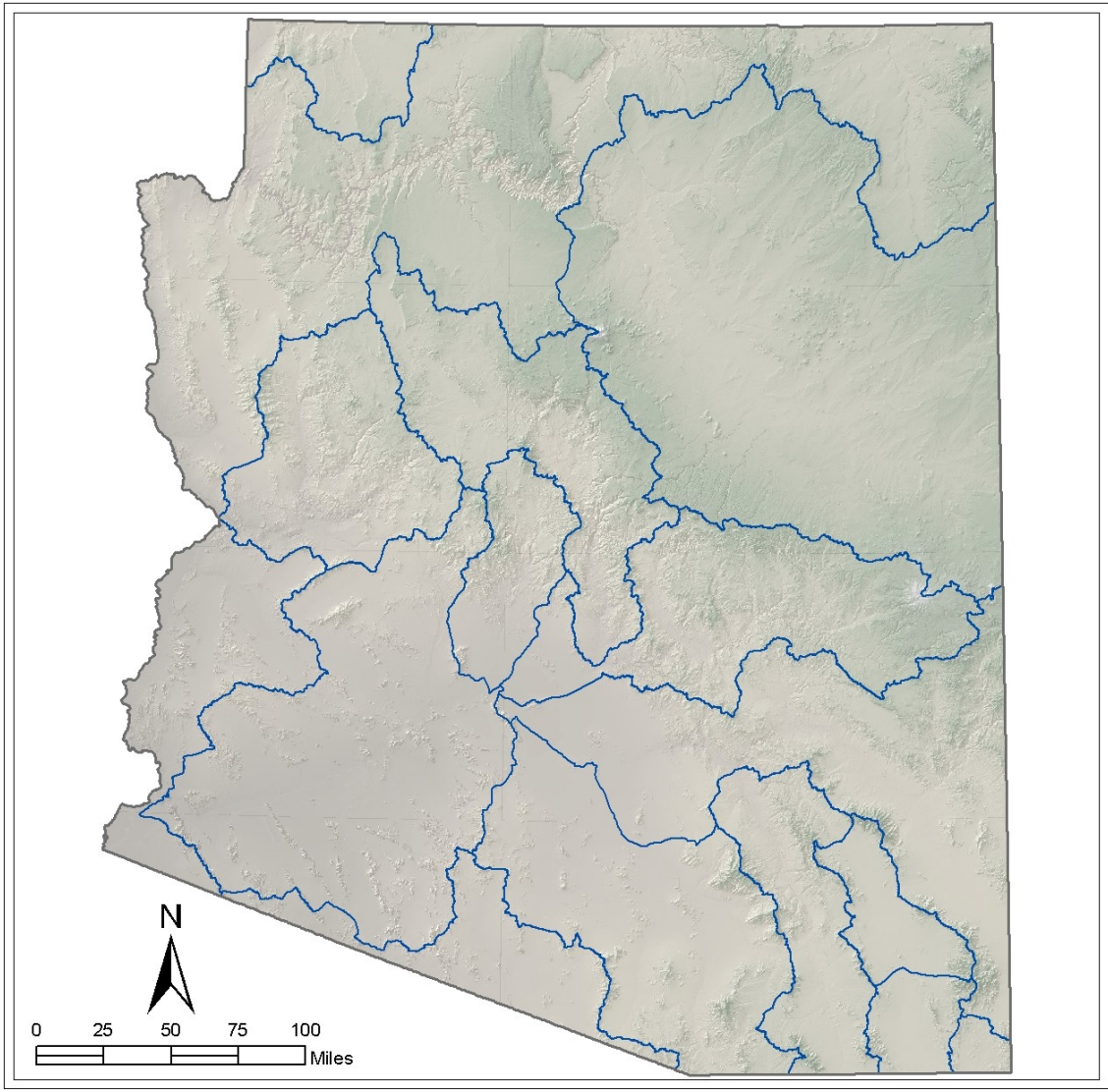
NOAA Regional Climate Centers


LOWER LAKE MAR

Spatial Resolution



Spatial Resolution



Watersheds

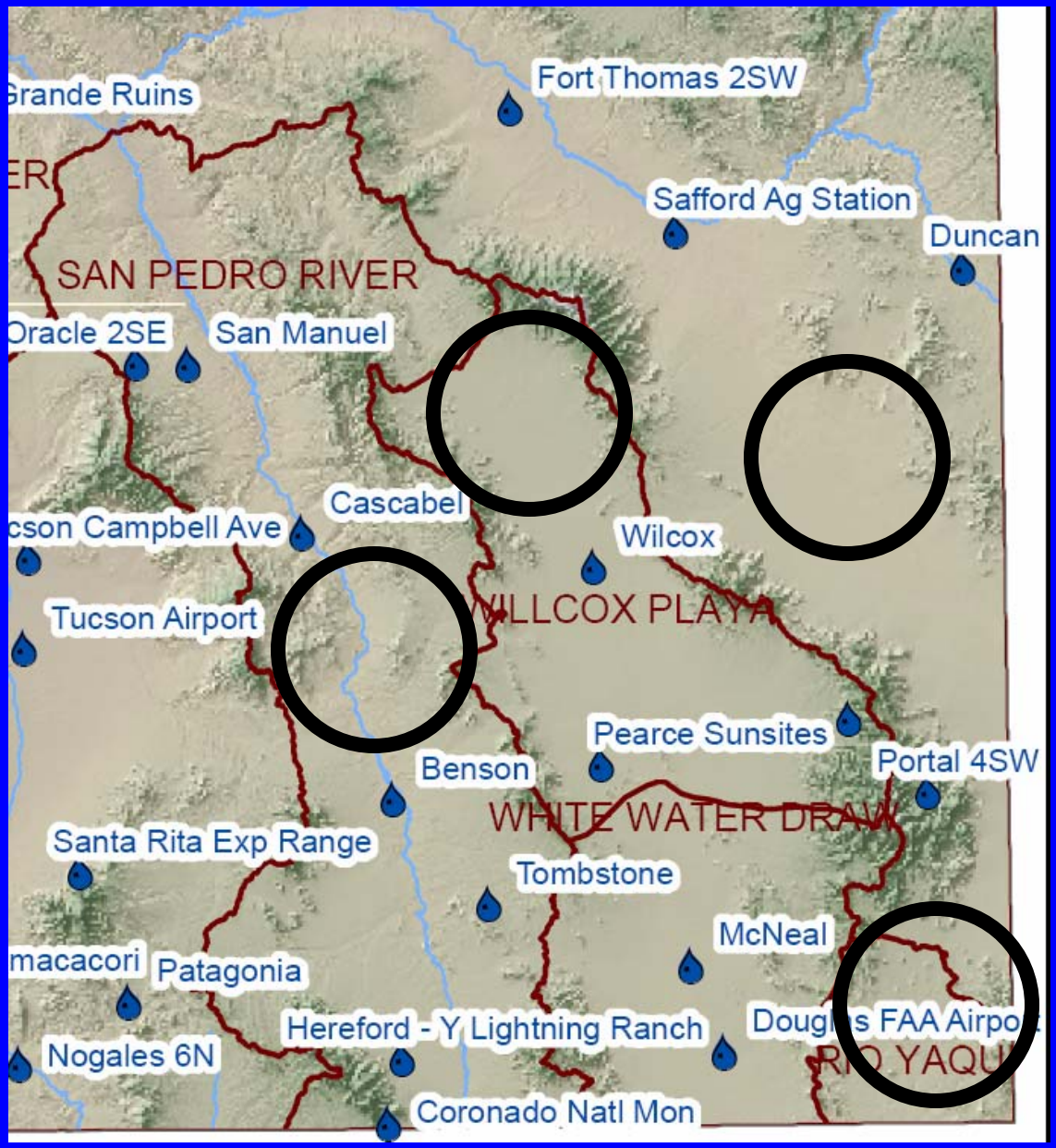
Arizona Drought Preparedness Plan Monitoring Technical Committee

Watersheds

Arizona Department of Water Reources

Watersheds and Rain Gages


Grande Ruins
ER
Fort Thomas 2SW
Safford Ag Station
Duncan
SAN PEDRO RIVER
Oracle 2SE
San Manuel
Cascabel
cson Campbell Ave
Wilcox
WILLCOX PLAYA
Tucson Airport
Pearce Sunsites
Portal 4SW
Benson
WHITE WATER DRAW
Santa Rita Exp Range
Tombstone
McNeal
macacori
Patagonia
Hereford - Y Lightning Ranch
Douglas FAA Airport
Nogales 6N
RIO YAQUI
Coronado Natl Mon


Fort Thomas 2SW
Safford Ag Station
Duncan
SAN PEDRO RIVER
San Manuel
Cascabel
Wilcox
Tucson Airport
Pearce Sunsites
Portal 4SW
Benson
Santa Rita Exp Range
Tombstone
McNeal
Patagonia
Hereford - Y Lightning Ranch
Nogales 6N
Coronado Natl Mon

LAIAGs & Drought Monitoring

LAIAGs can contribute

- Instantaneous conditions
- Credible information on local impacts
  - Impacts speak to decision-makers
- Quantitative precipitation totals through volunteer rain log network
  - Spatial variability
- Other hydroclimatic conditions – wind
- Verification

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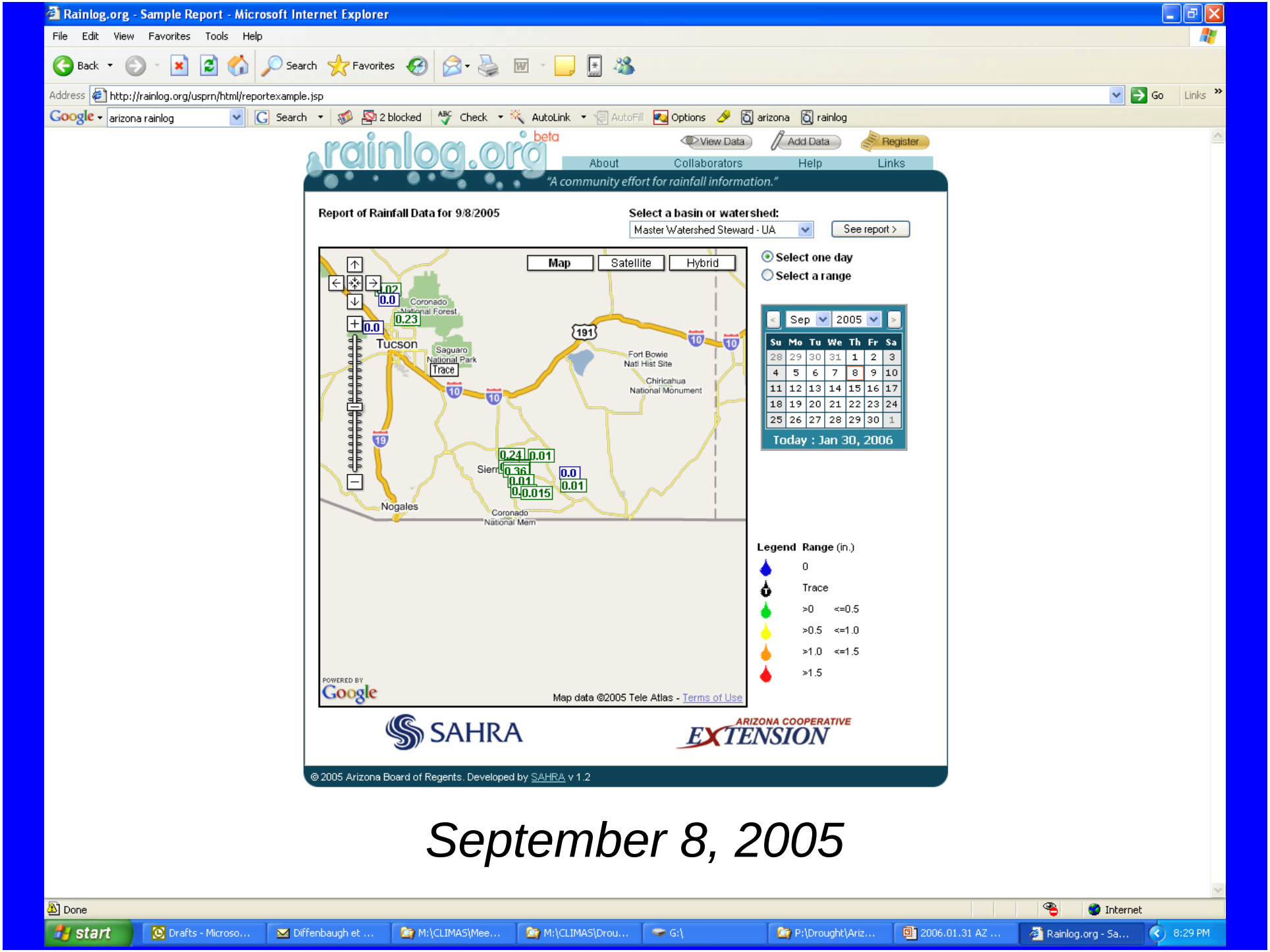
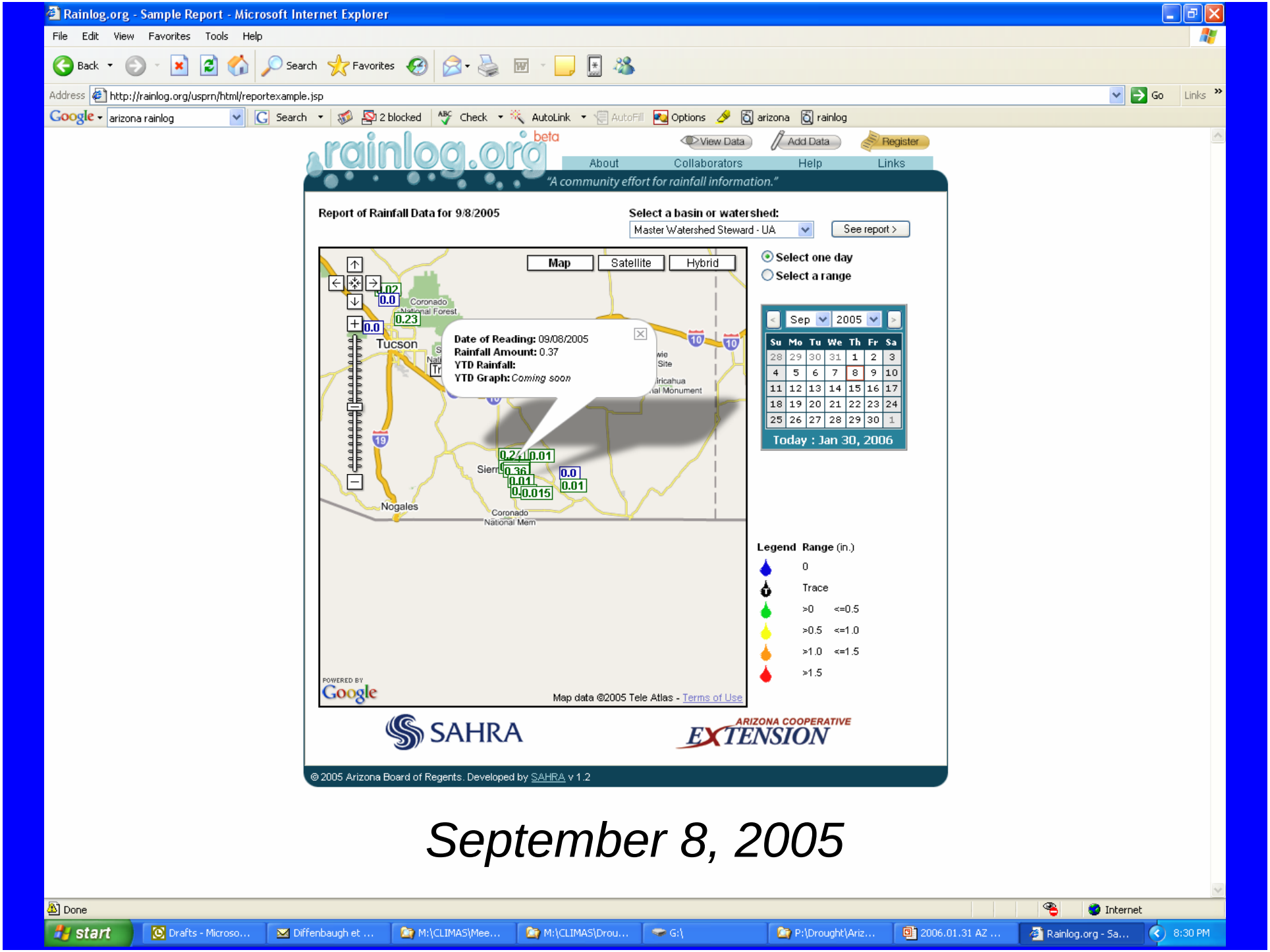
January 29, 2006



September 8, 2005



September 8, 2005

LAIAGs & Drought Monitoring

Drought impacts monitoring

- Hauling water, water conveyance issues
  - Seeps, springs, stock ponds
  - Soil conditions
  - Range impacts

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LAIAGs & Drought Monitoring

Drought impacts monitoring

- Vegetation condition
  - Indicator species
- Water table declines
- Wildlife
- Subsidence

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LAIAGs & Drought Monitoring

Drought impacts monitoring strategies

- Systematic monitoring of selected locations
- Opportunistic reporting of unusual conditions
- Quantitative monitoring
- Qualitative monitoring

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LAIAGs & Drought Monitoring

How do communities benefit?

- Pro-active approach saves money
  - Think Katrina

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LAIAGs & Drought Monitoring

How do communities benefit?

- Increased knowledge, improved reporting
  - State drought report – local conditions
  - Local variations
  - Information sharing

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LAIAGs & Drought Monitoring

How do communities benefit?

- Better coordination with the state
- Documentation for aid requests
  - Federal drought assistance
  - Infrastructure improvements
- Documentation for conflict resolution

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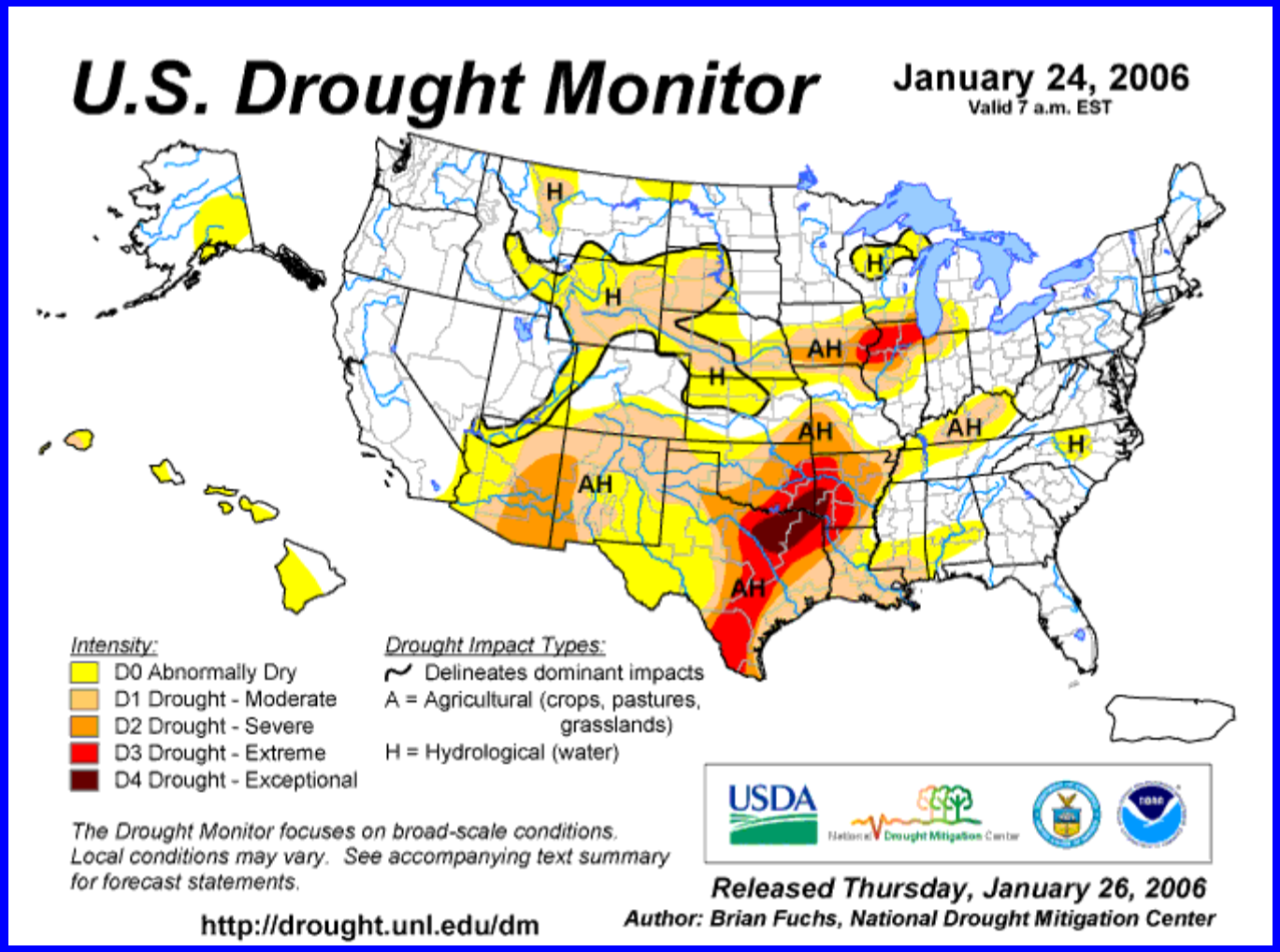
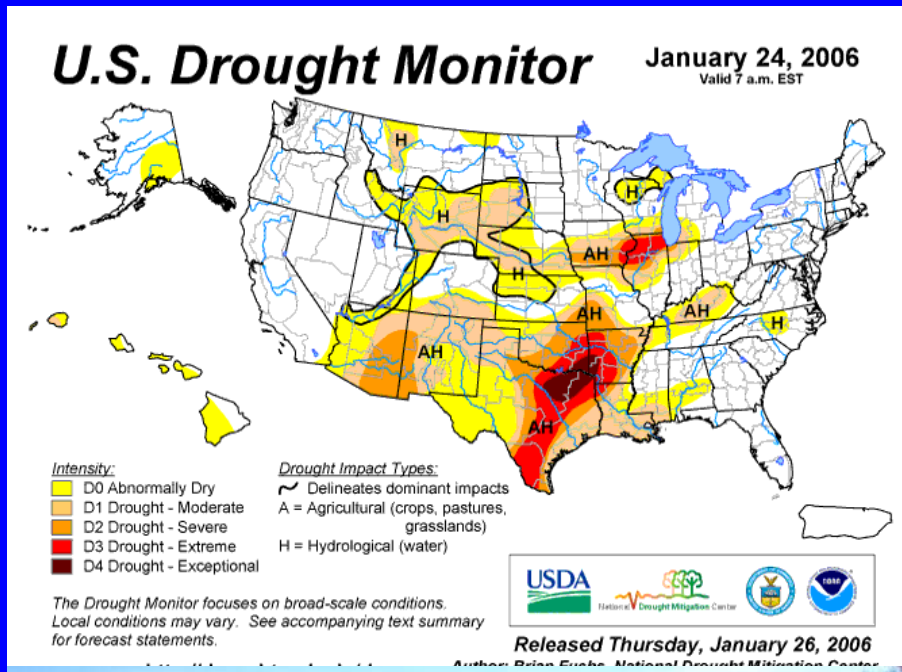
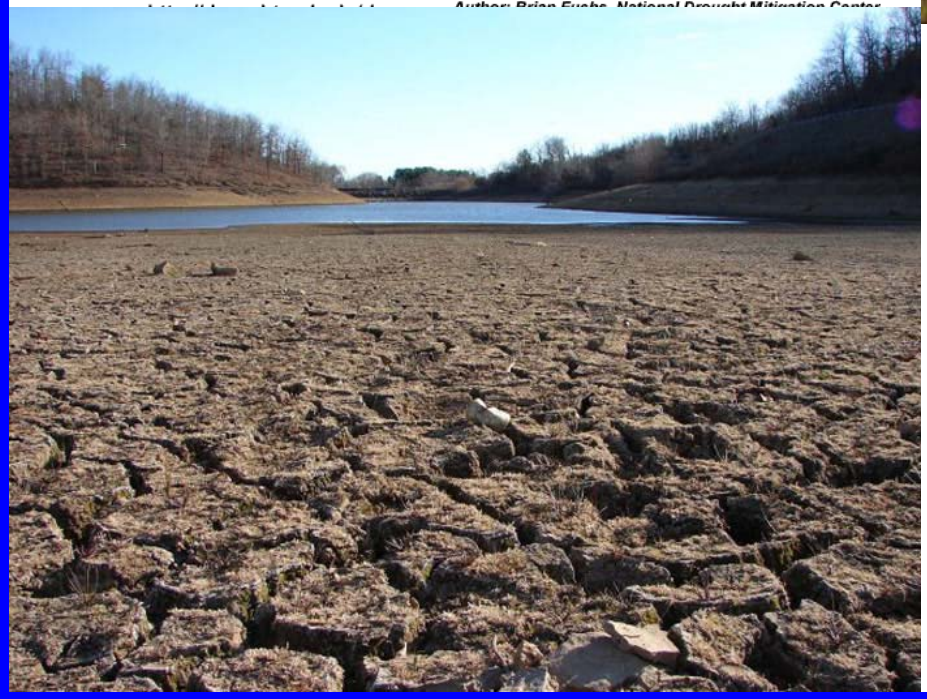
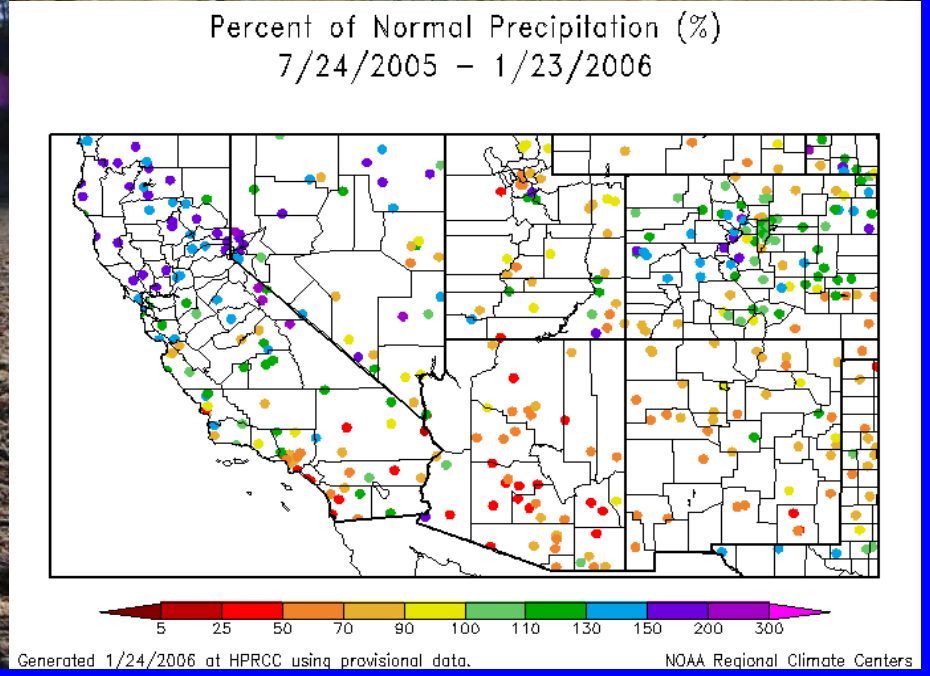
LAIAGs & Drought Monitoring




U.S. Drought Monitor
January 24, 2006
Valid 7 a.m. EST
H
H
H
H
AH
AH
AH
AH
H
AH
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
USDA
National Drought Mitigation Center
Released Thursday, January 26, 2006




Percent of Normal Precipitation (%)
7/24/2005 – 1/23/2006
5
25
50
70
90
100
110
130
150
200
300
Generated 1/24/2006 at HPRCC using provisional data.
NOAA Regional Climate Centers

How can the Monitoring Committee help?

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Headwater States Partnership

- Knowledge of local watersheds and resource conditions through establishment of scientific monitoring programs
- Experience implementing, monitoring, and documenting the success of restoration and other projects
- Consensus-building between local groups and government agencies
- Infrastructure for public outreach (websites, mailing lists)
- Capability to mobilize volunteer support for large local projects

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Components of Drought Risk Management

Risk = Hazard x Vulnerability

(natural event)

(social and other factors)

LAIAG

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Drought Monitoring Philosophy

- Climate Divisions
  - Big picture – raise the initial flag
  - Long-term data – comparison with past
- Multiple drought types and maps
- Incorporate short period of record and qualitative data
  - Corroborate status and enhance spatial precision

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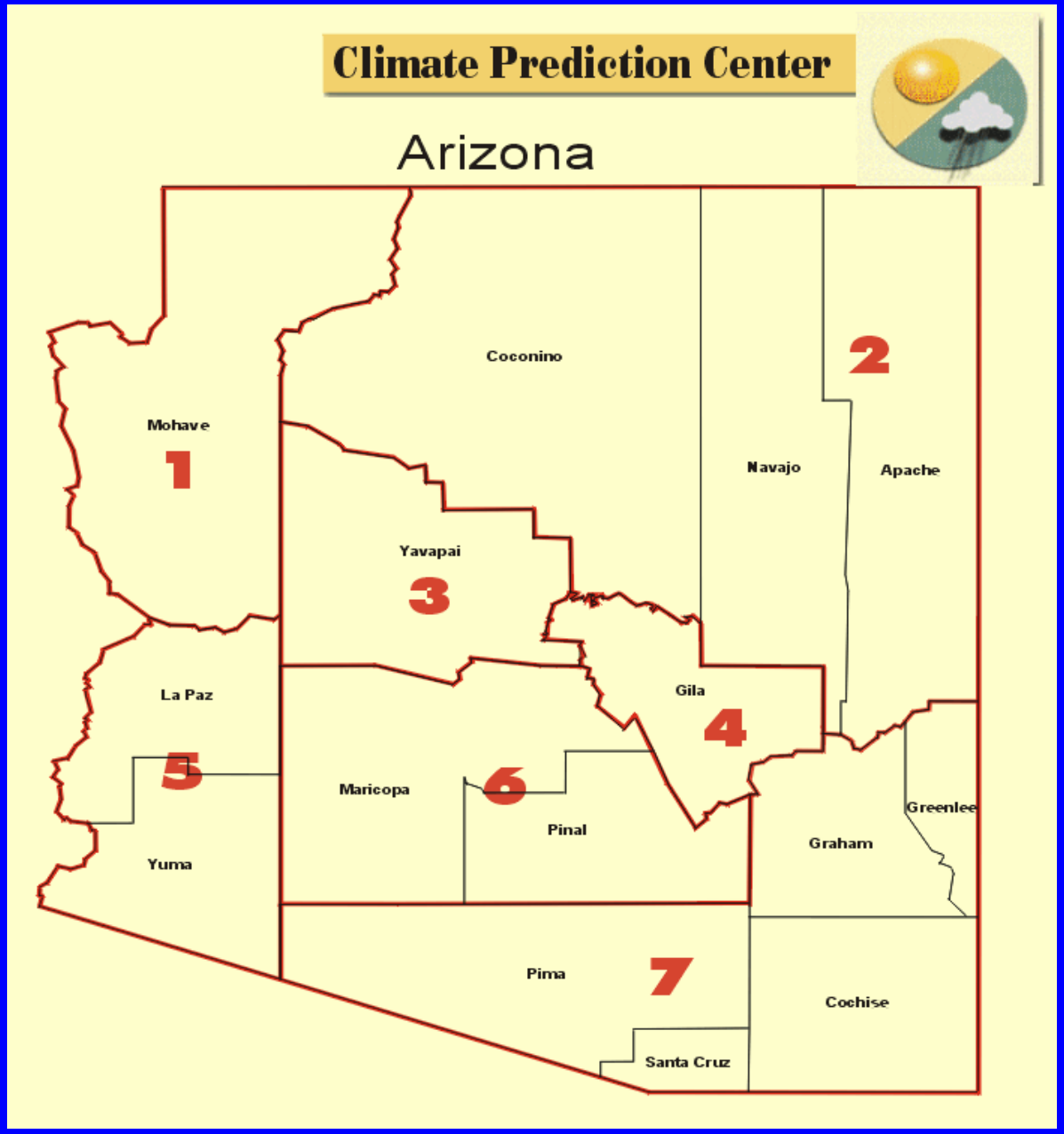
Climate Prediction Center
Arizona
Coconino
Mohave
1
2
Navajo
Apache
Yavapai
3
La Paz
Gila
4
5
Maricopa
6
Pinal
Greenlee
Graham
Yuma
Pima
7
Cochise
Santa Cruz

Drought Trigger Goals

- Advance warning going in to drought
- Cautious coming out of drought
- Smooth transitions between drought levels
  - Avoid jumping in and out of drought from month to month
- Consistency with historical impacts

Trigger Sequence

Drought *in* and *out* triggers

IN: When average of the indicators is at a certain (or more severe) level for 2 consecutive months

OUT: When average of the indicators is at a certain (or less severe) level for 4 consecutive months

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Indicators and Triggers

Short-Term					Long-Term												
Date	SPI_3_In	SPI_6_In	SPI_12_In	Final Drought Level	Date	SPI_24_In	SPI_36_In	SPI_48_In	Blue R. nr. Clifton	SF R. nr. Clifton	Gila R. nr. Solomon	San Pedro Palominas	San Pedro Charleston	Aravaipa Ck. Mammo	Santa Cruz Lochiel	Leslie Ck. McNeal	Final Drought Level
Jul-03	2	1	2	2	Jul-03	4	1	2	2	2	1	2	3	2	2	2	3
Aug-03	2	1	2	2	Aug-03	4	1	2	2	4	4	1	2	2	4	2	3
Sep-03	2	3	2	3	Sep-03	4	2	3	2	4	4	1	2	2	4	3	3
Oct-03	2	3	2	3	Oct-03	4	2	3	2	2	3	3	2	2	3	3	3
Nov-03	1	2	2	2	Nov-03	4	3	3	2	2	3	3	3	2	3	3	3
Dec-03	1	2	2	2	Dec-03	3	3	2	2	2	2	3	4	2	3	3	3
Jan-04	1	2	2	2	Jan-04	3	3	2	2	2	2	3	4	2	3	3	3
Feb-04	1	1	2	2	Feb-04	3	3	2	2	1	1	3	4	2	3	3	3
Mar-04	1	1	2	2	Mar-04	3	3	2	2	1	1	2	4	2	2	3	3
Apr-04	0	1	2	1	Apr-04	3	3	2	0	0	0	2	3	2	2	3	2
May-04	0	0	1	1	May-04	2	3	1	0	0	0	1	3	2	2	3	2
Jun-04	0	0	1	1	Jun-04	2	3	1	1	1	0	1	3	4	2	3	2

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Corroborative Data

Two step process

- Calculated drought status
- Consult additional data sources, in order to corroborate drought status and add spatial precision

Examples:

- Snowpack reports
- Range and pasture status reports
- Status of springs, seeps, ponds
- Satellite vegetation health
- Wildlife population statistics

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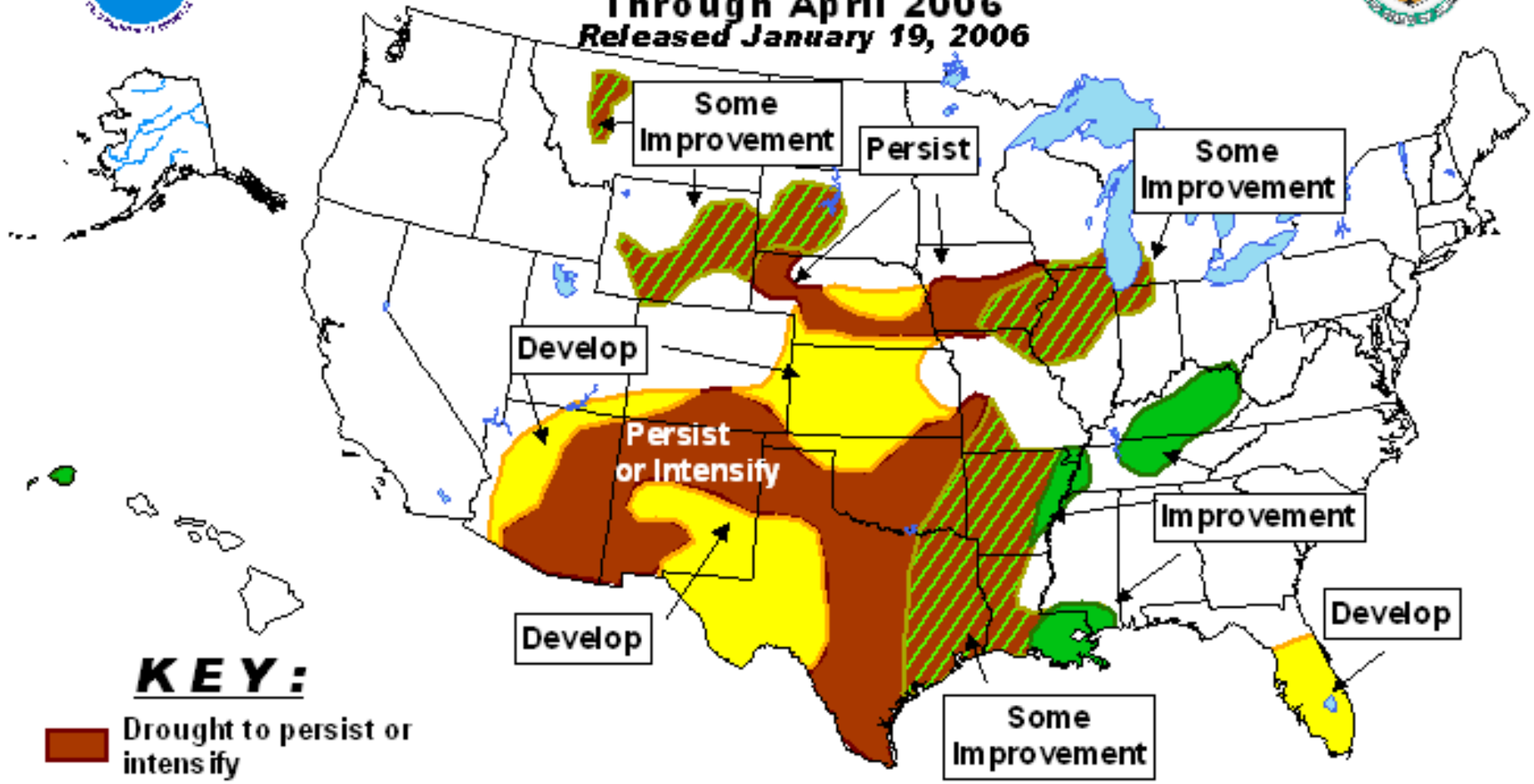
U.S. Seasonal Drought Outlook

Through April 2006

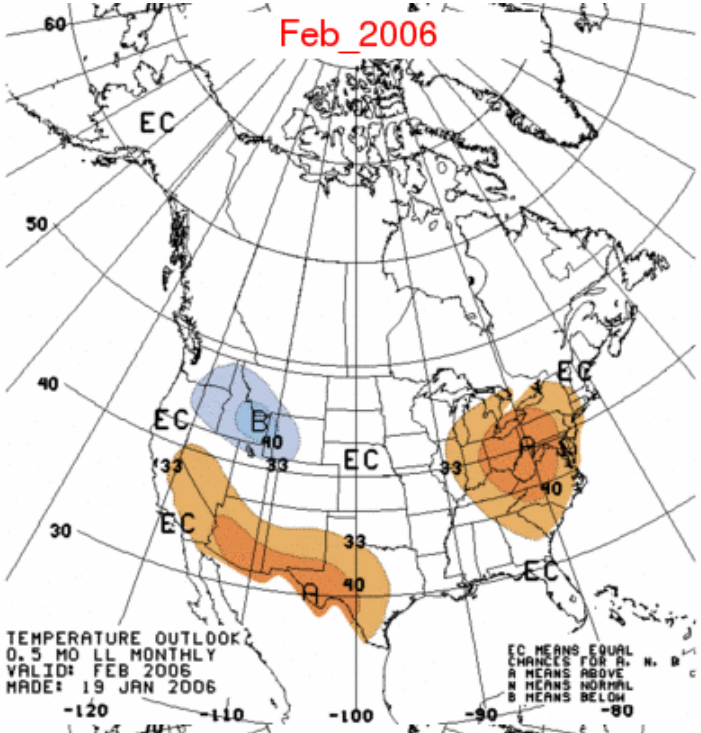
Released January 19, 2006

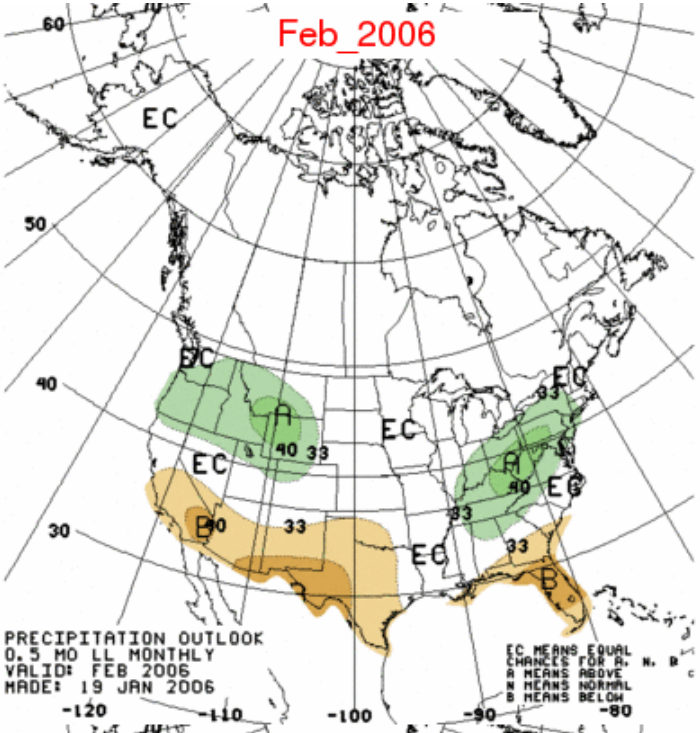


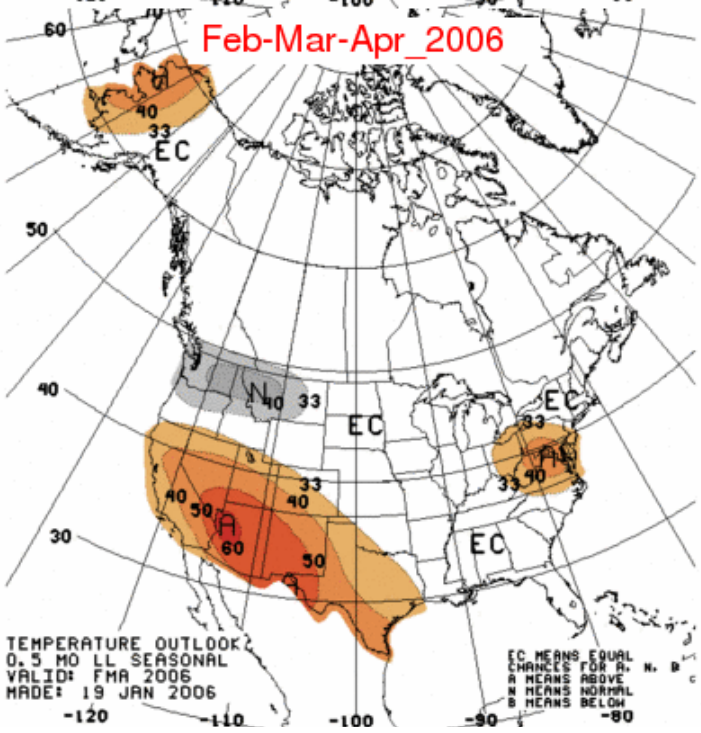
KEY:

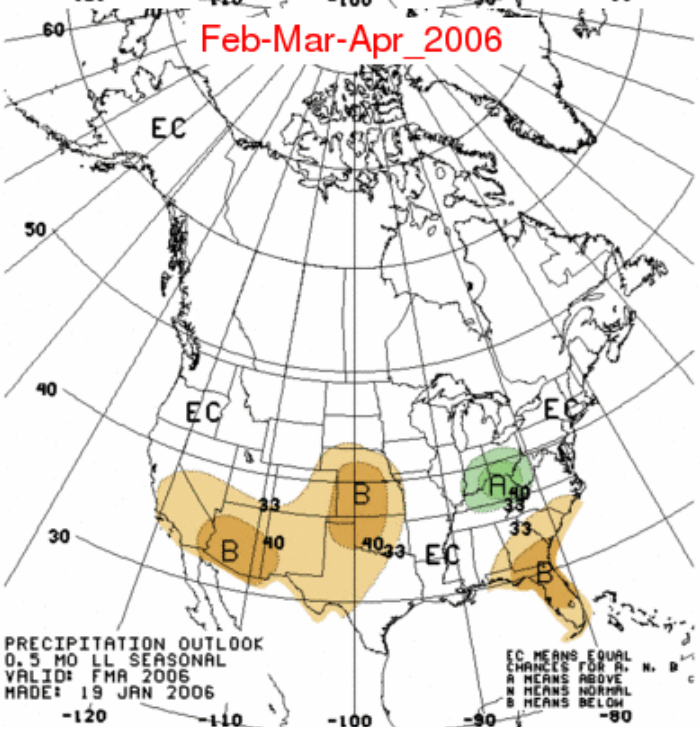
- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely

Depicts general, large-scale trends based on subjectively derived probabilities guided by numerous indicators, including short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more that a few days in advance, so use caution if using this outlook for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4). For weekly drought updates, see the latest Drought Monitor map and text. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.


Feb_2006
TEMPERATURE OUTLOOK
0.5 MO LL MONTHLY
VALID: FEB 2006
MADE: 19 JAN 2006
EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW


Feb_2006
PRECIPITATION OUTLOOK
0.5 MO LL MONTHLY
VALID: FEB 2006
MADE: 19 JAN 2006
EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW


Feb-Mar-Apr_2006
TEMPERATURE OUTLOOK
0.5 MO LL SEASONAL
VALID: FMA 2006
MADE: 19 JAN 2006
EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW


Feb-Mar-Apr_2006
PRECIPITATION OUTLOOK
0.5 MO LL SEASONAL
VALID: FMA 2006
MADE: 19 JAN 2006
EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW